Abstract of the Disclosure

A method decodes a received word for a binary linear block code based on a finite geometry. First, a parity check matrix representation of the code is defined. The received word is stored in a channel register. An active register represents a current state of the decoder. Each element in the active register can take three states, representing the two possible states of the corresponding bit in the word, and a third state representing uncertainty. Votes from parity checks to elements of the active register are determined from parity checks in the matrix, and the current state of the active register. A recommendation and strength of recommendation for each element in the active register is determined from the votes. The elements in the active register are then updated by comparing the recommendation and strength of recommendation with two thresholds, and the state of the corresponding bit in the received word. When termination conditions are satisfied, the decoder outputs the state of the active register. If the decoder outputs a state of the active register that does not correspond to a codeword, a new representation for the code using a parity check matrix with substantially more rows is chosen, and the decoding cycle is restarted.